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ABSTRACT

The purpose of this review article is to survey some cf the current research in linguistic syntax and the reading process. It also presents a summary of recent developments in applied linguistics. Reading comprehensicn is viewed as an interactive communication process where the reader uses his knowledge and cognitive-linguistic processes, especially his knowledge of syntax, to construct meaning from the printed page. Linguistic research on reading is reviewed, illustrating the parallel development of studies in syntactic-semantic theory and research on the reading process. The information is grouped under the following headings: (1) Modern Trends in Reading Education Theory; (2) Evolution of Syntactic and Semantic Theory; and (3) On Aspects of the Reading Process and Applied Linguistics. A bibliography is given for both general linguistics and reading education research until early 1975. (Author/AM)

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REVIEW ARTICLES

TOWARD UNDERSTANDING SYNTAX IN READING COMPREHENSION: REVIEW OF RESOURCES

John Barnitz

0. INTRODUCTION

The purpose of this review article is to survey some of the current research in linguistic syntax and the reading process. Doing language and reading research is like putting together a global jigsaw puzzle whose pieces are scattered among teachers and researchers in so many fields of education. Yet three dimensions of the research jigsaw puzzle can be distinguished: reading-language theory, reading-language curriculum, and reading-language pedagogy. There must be interactions among these parameters as they are focused upon the reading-language learner and the reading-language user.[1]

It could be assumed in mainstream linguistic-reading theory that the reader-listener-writer-speaker's knowledge of the world, his experiential background, his linguistic awareness and language experiences -- all interact through mental processes as he comprehends a written discourse. Thus, the research of applied linguistics and reading education cannot be separated in a discussion of reading comprehension. Likewise, the role of sentence structure cannot be ignored in reading comprehension theory, curriculum, or pedagogy. Some recent steps toward understanding the latter two "practical" parameters of reading education are Gray (1960), Eisenhardt (1972), Heilman (1972), and especially Ruddell (1974). Gray (1960) provides a detailed program of instruction for learning basic word analysis skills. Eisenhardt (1972) presents practical suggestions for using structural linguistics in the reading-language arts classroom. Heilman (1972) is a comprehensive survey of standard theories and methods of reading instruction. Ruddell (1974) demonstrates the role of language in practical applications to reading-language instruction. The present paper will focus on only one dimension of the reading jigsaw puzzle: syntax and reading comprehension theory. Researchers and students in

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the fields of linguistics and reading will be familiar with many of the works in the bibliography. Thus, this paper presents a convenient summary of recent developments in applied linguistics.

1.0. MODERN TRENDS IN READING EDUCATION RESEARCH

Although much research has been done in many areas of reading education, the study of syntax and comprehension has been given relatively little consideration. However, there were some major steps toward observing syntax in the reading behavior of children and adults. Goodman (1965a) outlines the Miscue Theory of oral reading. Schlesinger (1966) synthesises pre-1965 experimental syntax in studies of the reading process. Beaver (1968) provides a transformational explanation of oral reading behavior. Goodman (1969a) provides a hierarchy of reading miscues. Bormuth, Carr, Manning and Pearson (1970) presents a taxonomy of children's sentence comprehension. Carol Chomsky (1972) correlates language acquisition with reading exposure. Labov (1972) provides thorough discussions of social dialects other than the many standard English dialects.

Although reading researchers have barely begun to consider syntax, their attention has turned toward other issues of reading education. Much of the reading scene has been dominated by the writings of theorists, curriculum planners, and classroom teachers concerning the visual and phonetic-phonemic components of the reading process. Discussions of speed reading, skimming, scanning, dyslexia, phoneme-grapheme correspondences, phonics, the look-say method, oral reading, the Initial Teching Alphabet (I.T.A.), the Bloomfieldian so-called "linguistic approach" permeated all dimensions of the reading literature. Wardhaugh (1974) summarizes and critiques the theories of Bloomfield, Fries, Venezky, Chomsky and Halle and others who concern themselves with the phonological-orthographical aspects of the reading process. Arthur (1973) provides a discussion of possible word recognition strategies used by different readers as they match their phonological structures to print.

Many issues and trends in comprehension research have emerged to enlighten our understanding of reading-learning.[2] A taxonomy of basic psychological reading skills (e.g., detecting sequences, getting main ideas, understanding causes and effects, making inferences, etc.) was

developed. Measurement and evaluation procedures in standardized comprehension tests were designed. Correlations between comprehension and social class, race, personality, attitude, sex, reading rate were hypothesised. Relationships between textual structures and readability were studied. Many models of the reading process were proposed.

Further strides in reading research may be effected if one considers the applications of many studies in linguistics to reading education. However, there are problems in evaluating research in language and education. There often is a confusion with the term "linguistic approach" which commonly refers to Bloomfieldian reading materials and has broadened to refer to any reading method involving language. There is the misconception that teaching reading linguistically means teaching linguistics. The linguistic theory is the basis of research and curriculum, not the topic of a lesson in the classroom. As an even more common problem, there is an inevitable lag between the publication of a theory of language and its impact on other fields. Thus, it is important to consider upon which theories of language and psycholinguistics the reading theories are based. Each of the existing theories of psycholinguistics, syntax and semantics will have different possible applications to educational theories.[3] As a step toward understanding syntax in reading comprehension, a discussion of the ever-changing syntax scene now follows.

2.0. EVOLUTION OF SYNTACTIC AND SEMANTIC THEORY

Linguistic research in reading comprehension is based on an assumption that the reading process involves sentence processing. Furthermore, the listener's comprehension of sentence meaning is conditioned by many factors: (1) the role of the sentence in the discourse; (2) the context of situation (Firth 1957) which is defined by the disposition of the communicants in a specific sociological setting;[4] (3) the listener-reader's knowledge of the world (society, history, science, art); (4) the listener-reader's conscious and unconscious awareness of linguistic structures.[5]

Before surveying the evolution of syntactic theory, it is important to have a common understanding of the concepts grammar and syntax. A possible eclectic definition of grammar is that it is a dynamic network

of syntagmatic (linear), paradigmatic (Saussure 1916), pragmatic (Austin 1955) and hierarchical interrelationships within the total "context" of a sentence, paragraph, and discourse, and within the "context" of history, culture, and society (Firth 1957). It is assumed that the human mind demonstrates an infinite capacity to generate sentences (Chomsky 1965). Furthermore, language has many systems with phonological, syntactic, and semantic levels. The term syntax has two common meanings: (1) the observable and underlying structure of a sentence; (2) the scientific study of grammatical systems. Nonetheless, the word syntax must be understood in terms of the particular linguistic theory as twentieth century grammatical theory has ever been revolutionary. A discussion of the evolution of linguistic syntax and semantics now follows in order to show the ever-changing trends in linguistics. It is inevitable that these changes may affect reading research.

One of the most complicated tasks for any historian of linguistic theory is to trace the development of grammar in civilization. There is no space in this article to explain in depth the evolution of syntactic theories, their many schisms, and their many life cycles. Robins (1967), Waterman (1963), and Grinder and Elgin (1973) provide detailed summaries.

The mainstream of 20th century syntax before the late 1950's has been dominated by the structural linguistic philosophy. Then, a grammar of language was a description of the set of observable sentence patterns as used by speaker-writers of a language. Because the structuralists had very little concern with a description of meaning, semantics was ignored in their theories of language and language learning. Thus, structuralist syntax had a relatively small impact upon theoretical research in reading comprehension. However, structuralist phonemics has influenced the development of many beginning reading materials as reviewed by Aukerman (1971).

The development of the theory of generative grammar (Chomsky 1957 and 1965) sparked a major revolution in linguistic scholarship. The new theoreticians began to demonstrate how sentences are related. The Chomsky 1957 model described sentence patterns with phrase structure rules that produced phrase markers for basic sentence types called kernel sentences.

Single and double-based transformations substituted, deleted, moved, and embedded syntactic structures to generate an infinite number of sentences. However, the complex problems of capturing lexical and syntactic meaning were just beginning to be mentioned. Although the 1957 model has influenced other areas of English education (Thomas 1965), it had much less impact on reading comprehension research, except for Schlesinger (1966) and Bormuth et al. (1970).

After Chomsky (1957) linguistic theoreticians began to consider the problems of meaning in a model of language. Thus, in 1963, Katz and Fodor proposed a theory of the semantic component of language. Then Chomsky launched the Aspects model of grammar (Chomsky 1965). Kernel sentences, recursion by double-based transformations, and lexical insertion by phrase structure rules became theoretical constructs of the past. In 1965 the model of grammar became more explicit. A clear distinction was made between the base component and the transformational component. Deep structure as the exact level of lexical insertion was so defined. A serious discussion of lexical and syntactic meaning was included. Transformational grammar at last had a standard theory, further expanded with the syntactic constraints of Ross (1967) and with a more detailed focus on the "interpretive" semantic component by Jackendoff (1972). Because Chomsky's 1965 model was definitive and because semantic problems were considered, the theory had a phenominal impact upon psycholinguistics, applied linguistics, and likewise upon reading education. It is the Chomsky (1965) model that influenced much psycholinguistic research in reading comprehension. Goodman (1967) and Smith (1971) are examples. Although transformational grammar has shined a beaming light upon reading comprehension theory, the 1965 theory of grammar wasn't adequate to describe very recently discovered language phenomena.

As the M.I.T. linguists delved deeper into the caverns of meaning in the late 1960's, there emerged much distrust of the descriptive and explanatory adequacy of the revised standard theory of syntax in dealing with semantics. Thus, the late 1960's and early 1970's became the age of dissent. Lakoff, Ross, and McCawley digressed from the mainstream of analytical syntax and discovered new horizons for linguistic analysis:

Generative Semantics. The 1965 model and its revisions were criticized on all fronts by semantic theorists. New questions and controversial jousts emerged in the linguistics arena: Could English logically be a Verb-Subject-Object language? Could grammars have global and trans-derivational constraints as well as output conditions? Could symbolic logic, natural logic and predicate calculus replace deep structures as the underlying levels of language? Still more theories keep emerging. Maxwell (1972) provides a theory of semantic-lexical structure. Meanwhile, Fillmore (1968), Chafe (1970), and Cook (1970a and b) have developed their theories of case grammar and semantic relations. These theories have not yet been applied to reading research, although Allen (1964) and Pearson (1975) considered grammatical relations and semantic relations in their research.

Many seeds of semantic theory are also being planted in the garden of culture and pragmatics. While the American cultural-linguistic scene was dominated by Edward Sapir and Benjamin Whorf, who were influenced by Von Humbolt, the London school of linguistics was championed by J. R. Firth and later by his students such as M.A.K. Halliday. These latter scholars and J. L. Austin of the Oxford School of Philosophy studied speech acts and meaning in a sociolinguistic setting. Currently in America, there are streams of research in pragmatics, logic, and conversational import within a social setting as presented in Sadock (1974) and Cole and Morgan (1975). Many discussions of modern semantics are found in Steinberg and Jakobovits (1971), Kimball (1972) and (1973), McCawley (1973), Morgan (1973), and Green (1974). The reading specialist may consider the recent discoveries of semantic phenomena as crucial to reading comprehension. It is assumed that reading-language comprehension is affected by the reader's linguistic cues in the discourse, by the context of situation, by the speaker's knowledge of the world, and by the reader's language experiences. However, the research in syntax and semantics of the 1970's has not yet had its impact upon reading education.

3.0. ON ASPECTS OF THE READING PROCESS AND APPLIED LINGUISTICS

Although research in reading and language is growing, there has

been relatively little coproduction of linguistically-based reading comprehension theories. The mainstream of reading-language research has not progressed far beyond applications of the Chomsky (1965) model of generative grammar. However, this does not imply that reading specialists are not aware of post-Chomskian linguistics. The following is a brief discussion of some general themes which permeate much of the linguistic reading-process literature. The discussion will consider two areas: that of the reader-language user and that of trends in transformational psycholinguistics and the reading process.

Reading-language learning research is focused upon the language user and the language learner. Thus, a linguistic theory of reading should concentrate on the reader first. Reading educator Kenneth Goodman made a clear analogy between the young reader and a water glass half-filled (not half-empty) with water.[6] The water represents the reader's cultural and language experiences which he brings to the printed page in any classroom. In order to fill his own glass, the reader actively uses his own knowledge of the world, his life experiences, and his linguistic competence of any dialect. As the young reader has more cultural and language-reading experiences he will be able to acquire knowledge more efficiently from print.

The preceding statements seem to be in agreement with different mainstream definitions of reading comprehension. Gray (1960:10-12) viewed comprehension as the interdependence of four components of written information: word perception, comprehension of ideas represented by the words, personal reaction to these ideas, combination of new ideas with old ideas. Bormuth (1968:50) views comprehension to be an increase in information as a cognitive response to the language system of print. Bormuth's operational definition is that comprehension ability is thought to be a set of generalized knowledge-acquisition skills which permit people to acquire and exhibit information gained as a consequence of reading printed matter. Smith (1971) argues that comprehension is a reduction of uncertainty resulting from the reader's interactions with the language of print. Yet all these definitions are not far from what Thorndike wrote in 1917 (quoted by Simons 1971: 340):

Comprehension is "...a very complex procedure, involving a weighing of each of many elements in a sentence, their organization in the proper relations to one another, the selection of certain of their connotations and the rejection of others, and the cooperation of many forces to produce the final response." All these definitions imply that reading experiences involve the reader's language experiences. Yet language experiences cannot be separated from additional cultural experiences. All of his experiences are brought by the child or adult to the printed page and all interact with the cultural, attitudinal, and language experiences of the author. Because life experiences and language experiences are infinite, perhaps reading experiences are equally infinite.[7]

Some general views of reading comprehension having been discussed, a brief survey of psycholinguistically influenced theory of the reading process will now be presented. Goodman (1965a) claimed that the reading process involves the reader's active reconstruction of a message and that all reading behavior is caused by biologically innate hierarchical psycholinguistic processes. It is further claimed by Smith (1971) that a mature reader may interpret underlying deep structures without necessarily decoding to sound. The reader matches his own internalized language system to the underlying structures of the printed page as cued by surface structure clues. Reading is claimed to be rule governed and structures are therefore synthesized by the reader according to his internalized rules.

These claims are in accord with Chomsky (1965) which endeavors to explain the speaker-hearer's many creative propensities of using language as the following: The native speaker produces an infinite number of sentences. The speaker-hearer identifies sentences that are part of his language. He relates sentences with similar meanings and may also paraphrase them. He interprets the correct meaning of an ambiguous sentence within given contexts. Transformational grammar also attempts to account for the speaker-hearer's linguistic awareness of deletion recoverability in sentences, and to account for coreference relations as in pronominalization, reflexivization and in other anaphora phenomena. Substituting the word "reader" for "speaker-hearer," one

might make a case to support the claim that similar processes are involved in silent reading comprehension. A reader-listener may be able to predict the meaningful structures across gaps or ellipses in a discourse as he matches his grammatical system to what he expects from the syntactic structures in print.

That deletions are recoverable is a claim made by universal linguistic grammar. The concept of recoverability is also crucial to Taylor's CLOZE theory of reading based on the Gestalt theory of "clozure." It is claimed that an organism tends to form a complete whole by filling in gaps in a structure (Rankin 1959:238). The Cloze theory claims that a reader may predict any linguistic element that was deleted from a script. Because of semantic, syntactic, stylistic, and phonological redundancies within language, the reader may predict and comprehend the meaningful structures.

In summary, psycholinguistic reading theory claims that reading comprehension is triggered by linguistic cues. If the reader makes a wrong prediction (a wrong guess, a mistake, a mis-cue), there may be (but not necessarily so) a relative breakdown in comprehension.[8]

Psycholinguistic applications to reading education can lead to a more detailed understanding of the comprehension process. Smith (1973:7) mentioned some contributions to that understanding of reading:

> ... there is a trade-off between visual and non-visual information in reading - the more that is already known "behind the eyeball," the less visual information is required to identify a letter, a word, or a meaning from the text... The trade-off between visual and non-visual information is critical. The reader who relies primarily on visual information will simply overload his visual system, he will be unable to get as much information as he needs...

Although this position appears to oppose traditional structural positions of reading theory, the claim is not made that the reading-learning process must necessarily abolish grapho-phonemic or any phonological decoding. What is claimed is that the reader's interpretation of meaning,

structured by the language system, is the most crucial part of the reading process. Reading for meaning is more important than reading for sound.

4.0. CONCLUDING REMARKS

The above discussion of the reading process is only a sketch of the conclusions made from many psychological and linguistic experimental studies as discussed in detail in Schlesinger (1966), Singer and Ruddell, eds. (1970), Smith (1971) and ed. (1973), Kavanagh and Mattingly (1972), and Wardhaugh (1974). On the theoretical dimension of the role of linguistic structures in reading comprehension, some general conclusions may be drawn.

(1) Language processing is crucial to reading comprehension. However, it is not the exclusive set of mental operations involved. Reading comprehension is dependent upon the reader's knowledge of the world, his attitude toward the topic or author, and his purpose for reading. However the studies of the pragmatics of oral and written discourse may help lead to a new model of reading where world knowledge, attitude, purpose and linguistic structures are all interrelated.

(2) The reading process involves a rule governed system of communication from writer to reader. The reader uses his internalized grammar to determine the meaning of the sentences in the discourse. The reading process involves a close interdependency of linguistic experiences between author and reader.

(3) The reader plays an active cognitive role in reading communication. His past language experiences and his linguistic competence, and his non-linguistic perceptual skills allow him to process the structure of the text. The fluent reader uses his awareness of linguistic redundancies as he predicts the meaning of the text.

There can be little doubt that a linguistic theory of syntax would be relevant to understanding the reading communication process. What are the textual, semantic, and syntactic clues that trigger the reader's

comprehension of inferences, causes and effects, comparisons and contrasts, sequences of time and place, and other cognitive processes? How can research in semantics and syntax improve standardized reading tests? How can research in linguistic stylistics and psycholinguistics complement the research in readability, oral reading, and silent reading? What are the implications of sociolinguistics, pragmatics, and semantics upon our understanding of possible correlations among reading comprehension and race, social class, attitude, sex, and personality? All these general questions are some of the new frontiers for applied linguistics and reading education.

The purpose of this article was to outline the current state of the art of linguistic syntax and reading theory. Although research in syntax evolved separately from much research in reading, all theories of grammar may have implications for developing a better understanding of the reading process. Now is the time for building on the newly established tradition of applied linguistics, psycholinguistics, and reading education research.

FOOTNOTES

[1]The compound reading-language is borrowed from Ruddell (1974): Reading-language instruction: innovative practices. See bibliography.

[2]For a succinct survey of various reading approaches, see Simons (1971). To understand the wide variety of theoretical models of the reading process, see Singer and Ruddell, eds. (1970).

[3]For an understanding of the ever-changing implications of linguistics upon psycholinguistics, please read Maclay (1973).

[4]For a detailed survey of the contextualization process, see Kachru (1966).

[5]It is not implied that a reader must know linguistics or classroom rules in order to process information from print.

[6]Goodman made this analogy in a guest lecture at Northeastern Illinois University in the Summer of 1973.

[7]Perhaps all communication and learning experiences involve infinite hierarchical cognitive skills. Lindsay and Norman (1973) is a comprehensive treatment of information processing. Bloom et al. (1956) provides a detailed hierarchy of the cognitive domain of learning.

[8]For detailed discussions of oral reading performance phenomena, see Goodman (1965a), (1969a), (1973); Weber (1968); and Siler (1973).

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